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observing the breaking up of the ice at the second thaw; but, if I am correctly informed, it seems that the rough spongy and discoloured fragments of bottom ice did not make their appearance. The difference between the minima temperatures of the two periods of frost was nearly ten degrees; for the lowest temperature of the second period, which occurred on the 16th of January, was 12°·5; while the lowest of the first, which occurred on the third, was 2°·8. The difference in the resulting effects of the two periods with reference to the formation of ground ice may, therefore, be inferred to have arisen both from the inferior temperature of the first period and the suddenness of the thermal changes by which it was preceded and terminated.

XI.—ROUND TOWER OF ARDMORE. By HODDER M. WESTROPP, ESQ.

[Read April 8, 1867.]

THE summit of the cone of the tower of Ardmore was formed of two stones fitted together. There is scarcely any trace of carving or sculpture on them, they are so worn by the weather and defaced by time. On the side of the larger stone is a kind of groove or fluting, very perfect for about six inches; a corresponding ornamentation was evidently on the other side. On the upper part is a slight projection, which originally may have been a carved ornament. The immediate top bears evident traces of something having been broken off. The lower inner portion of each stone is hollowed out into a kind of angle, evidently to meet a corresponding rise in the platform stone they rested upon. No iron bolt or rivet was used to firm them in their position. The two stones fitted together, and formed the apex of the conical top of the tower. Some of the old people of Ardmore recollect seeing a cross on the top of it, which, it is said, was shot off some forty years ago by a gentleman firing at a crow perched on the top: Croker makes mention of it as being like a crutch. This very probably was the remaining portion of an Irish wheel cross, such as is seen over the door of the tower at Antrim.

XII.—DESCRIPTION OF CONTENTS OF A CAIRN AT HYAT NUGGER, IN THE DEKHAN. By COLONEL MEADOWS TAYLOR. [Abstract].

[Read April 22, 1867.]

THE articles enumerated in the accompanying list were found by Sir George Yule, K. S. I., late Resident at Hyderabad, and now a Member of the Council of India, in a cairn which formed one of a group near the town of Hyat Nugger, which is situated on the high road to Masulipatam, ten miles E. S. E. of the city of Hyderabad in the Dekhan. In my paper of 12th May, 1862, I brought to the notice of the Academy that the environs of Hyderabad afforded some very remarkable groups of cairns; and that, during examinations in several instances, by General J. S. Fraser, Captain, now Colonel Doria, and others, bells, iron weapons, and pottery, deposited in the Museum of the Royal Asiatic Society of Bombay, had been exhumed. In compliance with my request, Sir George Yule personally superintended the excavation of the cairn I now allude to, and has kindly sent me what he found in it. I have only to regret that no notes of the proceeding were taken; for it would have been interesting to know the size and configuration of this cairn, and the depth at which the remains were found, &c. Such particulars will, I trust be supplied to me hereafter, in regard to other cairns examined at Hyderabad or other localities in the Dekhan; and for the present I have only to offer a few remarks upon the character of the articles sent to me, which I present to the Academy.

IRON WEAPONS.

These are not so perfect as some obtained by me from Shorapoor cairns, but they are in some instances in fair preservation. The best are two triangular arrow heads of large size, figs. 1, 2. Others appear to have been smaller, and more pointed—round, perhaps, or four-sided: of these figs. 3, 4, and 5 are specimens. A rod of iron or steel, twenty-five inches in length, was no doubt the blade of a javelin, such as is used at the present day by Brinjarries, or grain carriers, who are descended from some ancient nomadic tribe. Two small lance or spear heads are very perfect, viz., figs. 6, 7; and there are some portions of what perhaps was originally a sword or dagger blade, fig. 8. The rest of the iron articles are, no doubt, portions of larger weapons, probably spears, but they are much decayed and broken.

BRONZE.

Although specimens of bronze in bells, cups, &c., were found in Hyderabad cairns, none were discovered by me in the examination of those of the Shorapoor district, which only yielded iron and pottery. It is difficult to determine what the precise use of the article now exhibited may have been; but it has a greater resemblance to a cover than anything else, (*vide* fig. 9). When received, the handle, which is in the form of a deer or a sheep, though most probably intended for the former, was separate from the cover; but it was discovered that the broken portions at the feet of the animal fitted exactly into a fracture at the top of the round portion; and they have been joined as represented. The diameter of the lower portion of the article is eleven inches, and the centre rises three and a half inches from the rim. The thickness of the metal is one-tenth of an inch, equable throughout; and it has been very carefully cast and finished, if not polished. The handle was evidently cast separately, and joined to the lower piece by solder. The quality of the metal does not appear to have been affected by time, and it is of a clear bright colour under the crust which covers it.

This very unique specimen of bronze work adds, I consider, very materially to the antiquarian interest which attends the Dekhan Cairns; and, with the bells, cups, and other articles in the Bombay Museum, affords evidence of a period at which remarkable skill existed in the casting of this metal. Whether in India it was used previously to iron, may perhaps be discussed; but that iron and bronze periods existed there, as well as in Europe, there can be no reasonable doubt; and I esteem myself peculiarly fortunate in being able to submit for examination by the Academy the first specimen of Cairn bronze which has, to the best of my knowledge, been transmitted to England.

Having thus evidence of iron and bronze periods in India, the Academy is already in possession of proof of a flint period in the remarkable specimens of chipped flints, agates, chalcedonies, and jaspers presented to it on the 10th April, 1865, by Mr. John Evans, at the instance of Sir Charles Lyell, F. R. S., which were found near Jubbulpoor, in Central India, by the late Lieut. Swiney. I have recently also seen a letter from Mr. Blandford, a deputy-superintendent of the Geological Survey, in which he states that in certain localities of the province of Nagpoor chipped flint articles have been found by him. I can state also, under my own knowledge, that at Lingsoogoor—a military station of the Hyderabad Contingent, thirty miles south of Shorapoor—numbers of flint (chert), agate, and chalcedony knives, resembling those of Mexico, arrow heads, &c., were found by the late Surgeon Primrose, near a large artificial tumulus upon which the mess house of the station was built in 1841. Dr. Primrose had previously resided in Mexico, and was struck with the identity of what he found at Lingsoogoor with the flint and obsidian knives he had seen in Mexico. His collection was a considerable one, and I believe was presented by him to the Museum of the Asiatic Society in Calcutta. I am at present endeavouring to obtain further specimens from Lingsoogoor for the Museum of the Academy.

SHELLS AND NECKLACE.

In the Hyat Nugger cairn, five shells of the species *Turbinella pyrum* were found. They are perforated at the top, so as to be suspended, and the apices of the shells have been removed. Whether these were intended to be used as conchs, or worn as ornaments, it is impossible to decide. From the largest of them all the whorls have been removed, as well as the central axis or column; and the necklace, fig. 13, proves the use that such columns were put to. It consists of six portions, which have been perforated longitudinally, in order to be strung—a small portion of shell, pierced with two holes, being evidently intended as a fastening for the ends of the cord on which the pieces of shell were strung. With the necklace was found what appears to be the upper tusk of a wild boar: it is not perforated. The use of shell necklaces by ancient races in Europe is evident from that in the Academy's Museum; but I am not aware that any of the kind now exhibited have been found before, nor did the Shorapoor or other cairns afford any.

POTTERY.

Of the specimens of pottery, one, a small red cup, three and a half inches in diameter, and two and a half inches in depth, is very perfect, fig. 10. Two other vessels, figs. 10, 11, both tolerably perfect, are of an hour-glass shape, and were, I conceive, the bodies of small hand drums, parchment or skin being fastened on the ends. The upper portion being larger in diameter than the lower would give a difference of sound to each end of the drum; and the hour glass shape for small hand drums of wood or copper is still in use in India. Another entire vessel is a cup, with a black glaze upon it, fig. 12. It is $4\frac{5}{8}$ inches in diameter, and $4\frac{3}{8}$ in depth, narrowing to the bottom, which is $4\frac{3}{8}$ in. in diameter. There are also two pieces of thick heavy pottery, which must have been parts of large vessels. One of these is a portion of the lip or upper edge of the vessel, which turns outward—the other also of a lip which turns inward. The small round cup may have been made by hand; but there are indications of the other vessels having been turned on a wheel which cannot be mistaken.

HUMAN AND ANIMAL REMAINS.

Of the bones transmitted to me, which were found in the Hyat Nugger Cairn, I am not competent to speak. Some are evidently human; and one elbow joint, apparently that of a woman, is very perfect. Others are those of animals; and perhaps some of the scientific anatomists of the Academy may be disposed to examine and report upon them all. It is at least certain that the cairn belonged to that section of the ancient race which buried their dead, as there were no traces of cremation in this cairn. It is not from a mere motive of curiosity that I propose scientific examination of the bones; for it has become a very important point, in determining the identity of the Indian Cairn constructors with those of Great Britain and of Europe to establish the fact of human sacrifice having accompanied interments. This will form an especial point in any future explorations with which I may be assisted by my Indian friends, and will be of the utmost interest in regard to those very unmistakeable evidences of human sacrifice which were brought to light by the Rev. W. Greenwell, of Durham, in the excavation of the Scamridge Barrow, Yorkshire, and described in the "Proceedings of the Archæological Institute," No. 86, of 1865, which were corroborated by discoveries of a similar character, by Dr. Thurnam, of Devizes, in Wiltshire Barrows; and when I compare the results attained by these gentlemen with my own experience in opening the cairns at Jewurgi and Andola, in the district of Shorapoor, it is impossible not to be struck with the more than mere coincidence—the absolute identity of the character of human sacrifice in localities so widely separated as Yorkshire and the Dekhan.

I am glad to observe that considerable interest has been excited in India on this subject; and any means of identification between the remains of Cairn races in England and India will go far to connect both with the dispersion of the nomadic Aryan race, which is already established by affinities of language. By an Indian newspaper of March 9th, I observe that, at a meeting of the Royal Asiatic Society of Bombay, on 14th February, 1867, Mr. Rivett Carnac brought to notice the results of the examination of barrows, supposed to be Scythian, at the village of Junapanee, near Nagpoor. Here pottery, spear and arrow heads, battle axes, and, perhaps the most curious of all, a horse's snaffle bit, and a small model in iron of a Scythian bow and arrow were found. Two pieces of curved iron, with loops at either end, were no doubt stirrup irons. Mr. Carnac states that similar barrows exist in other localities of Central India; and it is very satisfactory to know that the Antiquarian Society of the Central Provinces is taking great interest in the examination of these ancient remains.

XIII.—ON THE HISTOLOGY OF THE TEST OF THE CLASS PALLIOBRANCHIATA. By PROFESSOR W. KING, QUEEN'S COLLEGE, GALWAY. [Abstract.]

[Read April 22, 1867.]

IT is well known that a "canal system" characterizes many Palliobranchs—the valves being perforated obliquely, or perpendicularly, to their surfaces; and that, on dissolving the shell substance of the valves, each perforation is found to enclose a membraneous or fleshy cylindrical body, called a "cæcal appendage."

In the present paper the valves are shown to be covered with a cellular ("not a structureless") epidermis. Hitherto the perforations have been represented as showing themselves on the surfaces of the valves through openings in this covering; but such cannot be the case, inasmuch as the epidermis is absolutely imperforate and entire, like that of ordinary Molluscs.

According to previous observers, the presumed openings in the epidermis are each "closed in" by a "membranous disc," or "discoidoidal operculum:" it so happens, however, that what have been taken for bodies of the kind are the flattened extremities of the cæcal appendages (the former often broken off from the latter), lying against or adhering to the under side of the epidermis.

Under a hand magnifier the outer surface of the valves appear to be thickly studded with minute opaque spots. Examined with an ordinary microscope, each spot is resolved into a brush-like bundle, composed of short crowded lines, or rather tubules, radially arranged around a vacant centre. The tubules (which belong to, and penetrate, a thin calcareous layer, situated immediately beneath the epidermis) are confined to the apical portion of the perforations.

When a fragment of terebratula shell is dissolved, the flattened extremity of the cæcal appendages is found to be encircled with slender membraneous filaments diverging outwardly. The filaments are supposed by most observers to be "cilia," which served the purpose of driving currents of water through the perforations or cæcal appendages.